

Name: ..... Index No. ....  
School: ..... Candidate's Sign. ....  
Date: .....

233/3  
CHEMISTRY PRACTICAL  
PAPER 3  
TIME: 2 ¼ HOURS

# BUTERE EAST ZONE JOINT EVALUATION TEST

*Kenya Certificate of Secondary Education (K.C.S.E.)*

Chemistry Practical  
Paper 3

## INSTRUCTIONS TO THE CANDIDATES:-

- Write your **name** and **index number** in the spaces provided
- Sign and write the **date** of examination in the spaces provided
- You are not allowed to start working with the apparatus for the first 15 minutes. This is to enable you to read the question paper and ensure that you have all the apparatus and chemicals you may need.
- Mathematical tables and electronic calculators may be used.
- All working **MUST** be clearly shown where necessary.
- Answers to all questions must be written in the spaces provided in this booklet.

## For Examiners use Only

QUESTION	MAX. SCORE	SCORE
1	15	
2	12	
3	13	
<b>TOTAL</b>	<b>40</b>	

*This paper consists of 4 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

1. **You are provided with the following:**

- 1.0M hydrochloric acid; solution **T**
- 0.5M Sodium Hydroxide; solution **S**
- Anhydrous Sodium carbonate of unknown mass; solid **V**

You are required to determine the mass of Sodium carbonate that was used in the experiment.

**Procedure:**

Measure 60cm<sup>3</sup> portion of 1M Hydrochloric acid using a measuring cylinder and transfer it to 100cm<sup>3</sup> beaker. Add all Sodium carbonate (solid **V**) to the acid in the beaker and stir gently. Leave the mixture and add distilled water to make 100cm<sup>3</sup> of the solution.

Transfer all the solution into 250cm<sup>3</sup> beaker and shake well. Label this solution **W**.

Pipette 25.0cm<sup>3</sup> of solution **W** and transfer to a conical flask. Add 2-3 drops of Phenolphthalein indicator and titrate with solution **S**. records your results in table 1 below:

Repeat the titration to get more concordant values.

(a) Table 1

	1	2	3
Final burette reading (cm <sup>3</sup> )			
Initial burette reading (cm <sup>3</sup> )			
Volume of acid used (cm <sup>3</sup> )			

- (b) Determine the average volume of solution **S** used. (1mk)
- (c) Calculate the number of moles of Sodium hydroxide (solution **S**) used. (2mks)
- (d) Find the number of moles of Hydrochloric acid in 25cm<sup>3</sup> of solution **W**. (2mks)
- (e) Determine the number moles of Hydrochloric acid in 100cm<sup>3</sup> of solution **W**. (2mks)
- (f) Calculate the number of moles of Hydrochloric acid in the original 60cm<sup>3</sup> of solution. (1mk)
- (g) Calculate the number of moles of Hydrochloric acid that reacted with Sodium carbonate. (1mk)
- (h) Determine the mass of Sodium carbonate with the acid. (Na = 23, C = 12, O = 16) (2mks)

2. **You are provided with:**

- 0.9M Hydroxide solution **X**
- 0.5M oxalic solution **Y**.

You are required to determine the molar heat of neutralization of Sodium hydroxide.

**Procedure**

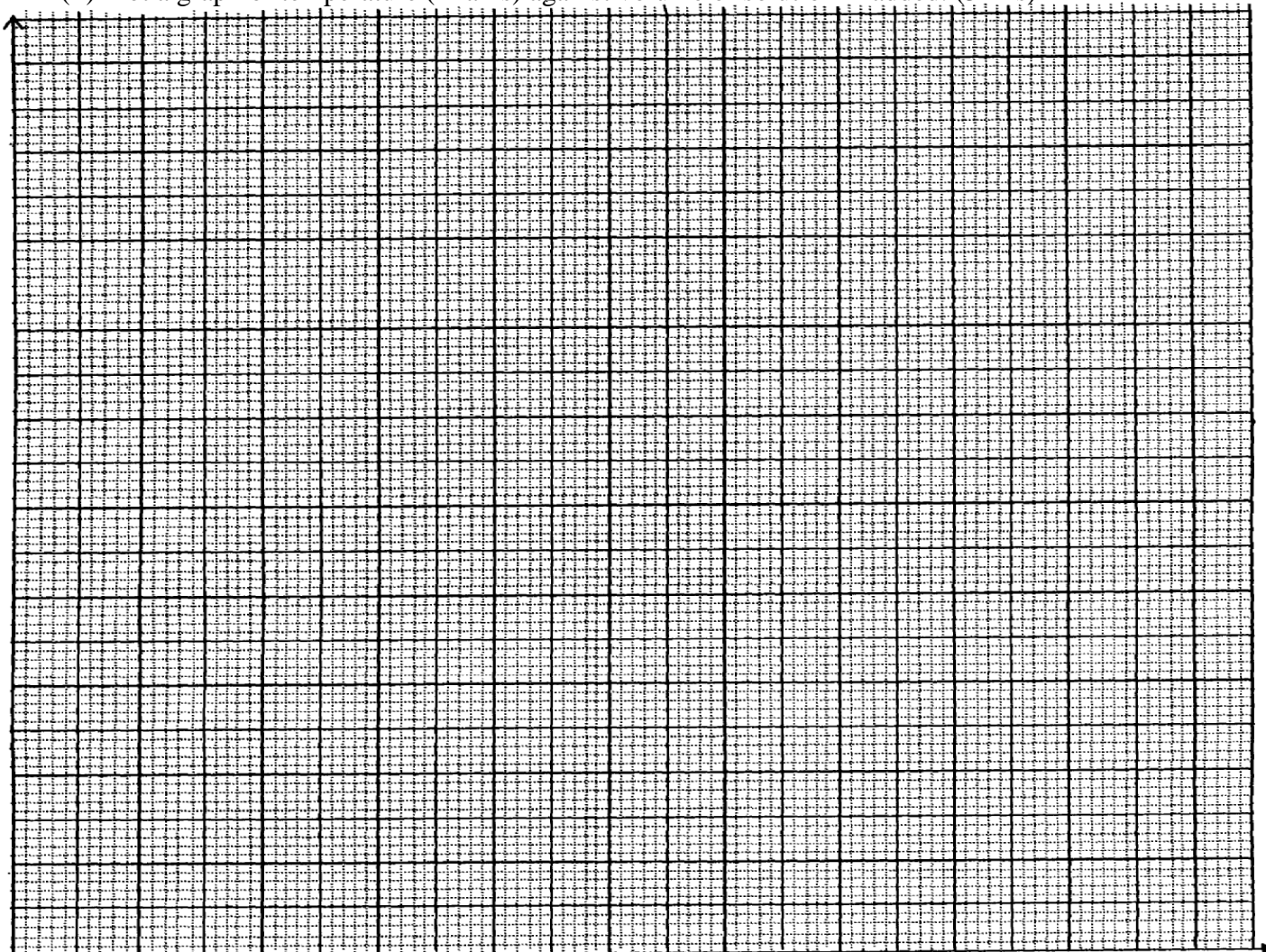
Place six test tubes in a test tube rack. Using a cylinder and place into 250m/s beaker. Measure the temperature of solution **X** in the beaker and record the steady value in table II below. Put first portion of the 10cm<sup>3</sup> of solution **Y** from the test tube into the beaker containing 50cm<sup>3</sup> of solution **X**. Stir the mixture carefully using a thermometer and record the highest temperature in table II below.

Pour the second portion of solution **Y** into the mixture in the beaker, stir record the highest temperature of this mixture in table II.

(i) Table II

Total volume of <b>Y</b> added (cm <sup>3</sup> )	10	20	30	40	50	60
Volume if <b>X</b> (cm <sup>3</sup> )						
Temperature (°C)						

(ii) Plot a graph of temperature (Y-axis) against volume of solution Y added. (3mks)



(iii) From the graph, find;

- (a) the volume of solution Y required to neutralize 50cm<sup>3</sup> of Sodium hydroxide solution X. (½mk)
- (b) the highest temperature change,  $\Delta T$ . (½mk)
- (iv) Calculate the heat change of reaction (assume density of mixture = 1gcm<sup>-3</sup> and specific heat capacity = 4.2KJ<sup>-1</sup>K<sup>-1</sup>) (2mks)
- (v) Find the number of moles of Sodium hydroxide solution X used. (1mk)
- (vi) Determine the molar heat of neutralization of Sodium hydroxide, solution X. (2mks)

3. You are provided with solid **Z**. Carry out the tests below:  
Record your observation and inferences in the spaces provided below:

<b>Test</b>	<b>Observation</b>	<b>Inferences</b>
	(½mk)	(½mk)
(i) To the first portion add dilute Sodium hydroxide drop wise until in excess.	(½mk)	(1mk)
(ii) To the first portion add aqueous ammonia drop wise until in excess	(1mk)	(1mk)
(iii) To third portion add a few drops of dilute Hydrochloric acid and warm to almost boiling.	(1mk)	(1mk)
(iv) To the fourth portion add drops of Barium chloride solution until in excess.	(1mk)	(1mk)
(v) To the fifth portion add drops of Potassium iodide solution until in excess.	(1mk)	(1mk)
(vi) To the sixth portion add a few drops of Sodium sulphate solution.	(½mk)	(½mk)